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The methodology of adaptation lines of the female body to moderate-intensity physical efforts

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Abstract

Currently, middle-aged women increasingly insist on maintaining body control, a trend observed across all strength-fitness spaces. As a rule, individuals encounter significant difficulties in selecting the appropriate volume of exercise and the intensity at which it should be performed, both of which may have highly unfavourable effects on certain physiological states. To prevent such inconsistencies, the present research proposes several methodological remedies that provide an optimal approach to adapting the female body to moderate-intensity physical effort during specialised strength-fitness training sessions. The purpose of these investigations is to determine an appropriate volume and degree of effort at a moderate intensity during the initial stage of training, allowing for efficient adaptation of the organism to subsequent workloads while respecting the principle of progressive overload in strength activities. The objectives that define the study's structural and content elements include: the essence of the concept of "adaptation" of the body to physical effort, the characteristics of the concept of "intensity" in performing physical exercises, and methods for adapting the female body to moderate-intensity physical effort. As outcomes of the study, the following are proposed: the development of strength-oriented physical exercise models to effectively adjust the female body to moderate-intensity efforts, and the identification of indicators that reveal the optimal degree of adaptation of the body to such activities.

Keywords: methodology, adaptation, female body, physical efforts, moderate intensity.

Currently, the trend of controlling one's physical appearance has become increasingly common among individuals. Those aiming for an optimal physical look and balanced body proportions often try to avoid restrictive diets, surgical procedures, and other methods that might influence the process, instead opting for a wide range of physical exercises. Specifically, middle-aged people experiencing certain biological and functional changes—whether mild or more significant—are becoming increasingly concerned about these transformations and seeking different methods to address them. In such cases, the most beneficial facilities, training centres, gyms, and similar environments are undoubtedly specialised fitness centres, especially strength-fitness facilities.

Once an individual becomes an active member of a fitness centre, they engage in various strength-focused activities and encounter different exercise volumes and intensities. Often,

such efforts lead to early depletion of the body's reserves, even in the initial training sessions, and this is usually worsened by the level of effort required. This may result in undesirable physiological states, and the person, aside from being taken out of their comfort zone, may eventually give up on the training programme. Therefore, in all cases, particularly concerning the female body, it is crucial to establish a preventive exercise plan with an adaptive nature, allowing the individual to complete the entire training regime effectively periods.

In this context, complex approaches to methodological aspects that highlight opportunities for adapting the female body to physical efforts of varying intensities reveal essential correlations between the subjects' interests, who strive for an optimal physical appearance, and the reality of their bio-psycho-motor potential.

The methodological approach, in this case, becomes one of the most cohesive aspects in executing adaptive motor actions, where physical activity relies on the suitable and balanced selection of forms, exercises, their content, and structure, as well as the optimal and beneficial volume and intensity with which they are performed (Ellsworth, 2012).

Characterised by coherence, flexibility, efficiency, and creativity in the exercise process, methodological approaches aimed at effectively adapting the female body to physical effort can incorporate various elements, including methodological principles, teaching strategies, teaching-learning methods, didactic techniques and procedures, instructional tools, and organisational forms.

To adjust the subject's motor potential to the requirements of effort, the methodological approach plays a crucial role in ensuring the efficiency of the training process through the optimal selection of effort dosage, alternating effort with rest and recovery phases, as well as structuring the content of exercises, execution techniques, psychological readiness, and other factors. The methodological component precisely enables optimal adaptation of the body to effort, promoting the development of necessary endurance levels and complete tolerance to training loads in structured physical activities.

The methodological aspect "constitutes the essence of the adaptation process, where compliance with rules that ensure the rational, scientific, and efficient conduct of the process of forming motor skills and abilities represents the foundation of physical training activities and expresses the way in which exercises are organised, explained, demonstrated, and consolidated to produce positive transformations in the individual's physical, psychological, and motor development" (Simion & Amzar, 2009).

Furthermore, the core of the methodology involves adjusting teaching methods and implementation techniques to match students' levels of preparation, using appropriate tools. This approach aims to ensure gradual, balanced, and efficient progress in how efforts are perceived, leading to continual, progressive outcomes.

Methodological approaches for strength exercises are specific ways in which exercises aimed at increasing muscular strength are organised, planned, and implemented based on the goal, level of preparation, age, and individual characteristics of the practitioner. These approaches are grounded in scientific and pedagogical principles that guarantee the effectiveness of the training process and promote optimal adaptation of the body to strength loads.

Essentially, strength-training instruction with an adaptive nature can be achieved through various methodological approaches that differ based on how effort is organised, the structure of exercises, the intensity, and the objectives.

Regarding the essence of the concept of "adaptation" of the body to physical effort, it consists of "the biological and functional capacity of the human body to modify its structure and functions positively in response to the repeated action of physical effort" (Brooks, Fahey, & Baldwin, 2022). In other words, adaptation is a complex process through which the **body gradually becomes accustomed** to the demands of physical activity, becoming more resistant, efficient, and able to cope with increasingly demanding workloads. Therefore, optimal adaptation is achieved through gradual effort and sensible dosing, alternating periods of exertion with recovery. In educational and sporting contexts, the aim of physical training is precisely the development of adaptive capacity—the transformation of temporary reactions into stable and effective modifications of the body. Through training, the body becomes more economical, balanced, and resilient to physical stress, maintaining its functions within optimal limits even under challenging conditions.

In conclusion, the essence of the concept of "adaptation" of the body to physical effort lies in the biological process through which the body responds, reorganises, and improves under the influence of physical exercise, acquiring a superior capacity for effort. Adaptation results from the interaction between the physical stimulus (effort) and the body's internal responses, forming the foundation of motor, health, and athletic development.

On the other hand, the concept of "intensity" in performing physical exercises represents the degree of physiological demand placed on the body during effort, that is, the force with which movements are executed and the level of functional strain they impose on bodily systems (cardiovascular, respiratory, muscular, nervous, etc.). In other words, intensity reflects how hard the body works during exercise and is a key indicator of training quality and effectiveness (Delavier & Gundill, 2015).

The intensity of physical effort is a fundamental component of training load. It refers to the amount of energy consumed per unit of time, the speed of exercise execution, and the level of physiological involvement of the body. In practice, it reflects how demanding exercise is for an individual, regardless of its duration.

Forms of Intensity:

- low intensity – involves light, long-duration effort, with a heart rate between 100–130 beats/min (e.g., walking, light jogging, warm-up exercises).
- moderate intensity – moderate exertion, with a heart rate between 130–160 beats/min; exercises can be sustained for an extended period, such as continuous running or endurance-type activities.
- high intensity – very demanding, short-duration effort, with a heart rate above 170 beats/min (e.g., sprints, weightlifting, plyometric exercises) (Joy et al., 2016).

The role of intensity in physical training represents the main factor that determines the body's adaptation to effort. The intensity of physical exercise is the degree of strain placed on the body and is an essential criterion for planning, monitoring, and ensuring the efficiency of motor training. It determines the type of adaptation achieved (aerobic, anaerobic, strength-based, or speed-based), influences training duration and frequency, and serves as the basis for physical progress. Properly dosed intensity leads to harmonious physical development, improved performance, and the maintenance of health, making it one of the most important methodological components in physical activity.

It is important to highlight the significance of intensity gradation in adaptive exercises. Intensity gradation in physical exercise is a system for classifying effort based on the level of strain it places on the body. In other words, it expresses the steps by which intensity increases or decreases, from light effort to maximal effort. This gradation plays a significant methodological role by ensuring appropriate effort dosing based on age, fitness level, training goals, and an individual's state of health (Dudnic et al. 2024).

Moderate-intensity effort involves moderate strain on the cardiovascular and muscular systems. In this case, the heart rate reaches 130–160 beats per minute, breathing becomes more frequent, and sweating occurs naturally. This type of effort can be maintained over an extended period and is typical of aerobic exercises, light running, recreational cycling, or general fitness gymnastics. Moderate intensity is the most recommended for developing general endurance and maintaining health because it stimulates adaptation without overtaxing the body.

The gradation of exercise intensity reflects the progression from light to moderate, then high and maximal effort, each level having a clearly defined role in the training process. Using these stages correctly leads to the best results in developing motor capacities, improving health, and increasing physical performance while respecting the body's limits of adaptation.

The adaptation of the female body to moderate-intensity effort is a complex process in which the body gradually modifies its physiological functions, muscle structures, and energy systems to sustain effort without excessive fatigue or adverse health effects. This process develops over time through regular, progressive, and well-dosed practice, and is influenced by the specific biological and hormonal characteristics of the female body (Evans, 2007).

At the beginning of practising moderate-intensity exercise, the female body responds with a series of immediate physiological reactions, such as increased heart rate, respiratory rate, and blood flow to the muscles. These reactions ensure a greater supply of oxygen and nutrients to active tissues, supporting energy processes. Over time, through systematic repetition of effort, these reactions transform into stable adaptations that improve the body's overall efficiency.

Methodological Investigation Elements

In this study, the aim is to establish optimal volume and degree of physical effort for women at a moderate exercise intensity during the initial preparation stage, to ensure the most effective adaptation of the body to effort conditions.

Among the study **objectives**, which define the structural and content elements of the investigation, are the following: identifying the concept of "adaptation" of the body to physical effort, justifying the concept of "intensity" in performing physical exercises, and characterising the modes of adaptation of the female body to moderate-intensity effort.

Thus, when characterising the modes of adaptation of the female body to effort, it should be noted that these represent "the totality of biological, functional, and psychological transformations through which the woman's body reacts and adapts to the demands of physical activity" (Kenney et al. 2020). These processes occur gradually through regular, progressive physical exercise and aim to increase functional efficiency,

develop capacity for effort, and maintain overall health. Adaptation depends on factors such as age, training level, type of effort, hormonal status, and environmental conditions in which the activity takes place.

1. Cardiovascular Adaptation- One of the most important modes of adaptation to effort is that of the cardiovascular system. During physical exercise, the woman's heart increases its pumping capacity, increases the volume of blood ejected with each beat, and improves peripheral circulation. With regular training, resting heart rate decreases, and blood pressure stabilises. Blood vessels become more elastic, and oxygen delivery to muscles increases, allowing sustained efforts of medium and long duration. The efficiency of oxygen transport is also improved through increased capillary density and better haemoglobin function.

2. Respiratory Adaptation- the female respiratory system adapts by increasing lung capacity and ventilation efficiency. During effort, the lungs work more intensely, and the respiratory muscles strengthen, allowing deeper and more efficient breathing. Adaptation improves blood oxygenation and accelerates carbon dioxide elimination, reducing fatigue. Long-term training also improves respiratory control, which is beneficial for activities requiring rhythm and coordination.

3. Muscular Adaptation- at the muscular level, physical exercise increases strength, tone, and muscular endurance. In women, these changes do not lead to a massive increase in muscle mass, due to lower testosterone levels compared to men, but rather to improved firmness, elasticity, and muscular efficiency. The number of capillaries in the muscles increases, glycogen stores grow, and the efficiency of enzymes involved in energy production increases. Muscles become more coordinated and more resistant to fatigue, enabling more precise and graceful movement.

4. Metabolic Adaptation-regular physical effort produces important metabolic changes in women. Fat-burning processes intensify, basal metabolic rate increases, and the body's ability to use energy efficiently improves. Trained women show better glucose tolerance, stabilised body weight, and hormonal regulation that supports overall health. At the same time, the body's capacity for recovery and adaptation to various forms of physical activity increases.

5. Hormonal Adaptation- the female endocrine system reacts to effort by adjusting hormonal secretion. Moderate physical exercise helps balance estrogen and progesterone levels, reduces premenstrual syndrome symptoms, and maintains bone health by preventing osteoporosis. Physical activity also stimulates the release of endorphins and serotonin, hormones that promote well-being and reduce stress. Hormonal adaptation positively influences metabolism, sleep quality, and mental health.

6. Neuromuscular and Psychological Adaptation- regular exercise improves coordination between the nervous and muscular systems, resulting in more precise movements, faster reactions, and better effort control. Psychological adaptations co-occur with increased self-confidence, willpower, stress resilience, and concentration capacity. Women become more motivated, disciplined, and resistant to mental fatigue.

7. Thermoregulatory Adaptation- the female body also adapts in terms of thermoregulation, improving its ability to eliminate heat through sweating and maintain internal temperature. This aspect is essential during prolonged efforts, helping maintain performance and prevent overheating.

8. Morphofunctional Adaptation- long-term regular physical activity produces structural and functional transformations: improved posture, increased bone density, reduced fat deposits, and balanced body proportions. All these changes contribute to a harmonious physical appearance and the maintenance of overall health.

As a *result of the study, models of strength-oriented physical exercises are proposed to ensure efficient adaptation of the female body to moderate-intensity efforts and to identify indicators of* the optimal degree of adaptation to such activities.

Models of Strength-Oriented Training Programs and Exercises for the Efficient Adaptation of the Female Body to Moderate-Intensity Effort

Strength-oriented physical exercises designed to adapt the body to effort aim to develop overall muscular strength, increase tone, and improve endurance without overloading the physiological systems. This type of exercise can be progressively applied to women, respecting the principles of effort gradation, individualisation, and recovery.

A weekly cycle typically includes three training sessions. To achieve optimal results, each training session is recommended to be at least 90 minutes.

Conventionally, a training session can be divided into three parts: preparatory part, main part, and concluding part, structured as follows: preparatory part – approximately 15 minutes, divided into three 5-minute subdivisions: aerobic effort (e.g., brisk walking or light jogging), simple circular movements to prepare joints and tendons for the main exercises, stretching exercises, especially targeting muscle groups that will be used in the main part of the session.

Main part – approximately 60 minutes, with three subdivisions: complex exercises (e.g., rowing, incline bench press, multifunctional machine exercises) for about 30 minutes, 3 sets per exercise, 8–10 repetitions per set, special strength exercises for about 15 minutes, 3–4 sets with 6–8 repetitions per set, auxiliary exercises for about 10 minutes, mainly with additional weights or on machines, 3–4 sets of 8–10 repetitions per set.

Training intensity: 50–60%.

Concluding part – approximately 15 minutes, consisting of: cardio exercises – about 10 minutes and stretching and relaxation exercises – 5 minutes.

Strength exercises for adapting the female body to moderate-intensity effort can also be performed in other formats. For example, during the preparatory stage, exercises may include joint mobilization activities, which gradually increase heart rate and stimulate blood circulation. Examples include brisk walking, light jogging, arm and torso rotations, and body weight squats.

In the subsequent stages of training, the program may include: *general strength exercises* – targeting major muscle groups to develop muscular strength without overloading, using body weight or light weights, complementary strength exercises – for the abdominal, back, and core regions, supporting posture and overall body stability.

Examples of Exercises from the Strength Complex

1. Exercises for Lower Limbs:
- Simple squats (or with light weights): 3 sets of 10–12 repetitions.

- Forward or lateral lunges: 3 sets of 10–12 repetitions per leg.
- Calf raises (using body weight or with 20% of body weight as additional load): 3 sets of 15–20 repetitions.

2. Exercises for Upper Limbs:
- Arm flexion and extension from lying support (modified with feet on a gym bench and palms on the floor): 3 sets of 6–8 repetitions.
- Lateral raises with small weights (1 kg in each hand): 3 sets of 8–10 repetitions.
- Triceps, trapezius, latissimus dorsi extensions (using light weights or elastic bands held at ¾ distance from the waist, depending on the band stretch): 3 sets of 10–12 repetitions for each arm position, both frontal and dorsal planes.

3. Exercises for Trunk and Abdomen:
- Trunk flexion and extension from dorsal decubitus to seated position: 3 sets of 10–12 repetitions.
- Plank (horizontal support on forearms and toes): hold for 20–40 seconds, three repetitions.
- Back extensions from ventral decubitus, not below 60 degrees: 3 sets of 10–12 repetitions.

Guidelines for All Exercises:
- Effort gradation: start with light weights and fewer repetitions, gradually increasing as the body adapts.
- Individualisation: exercises are adapted to fitness level and health condition, with systematic monitoring of results (daily and weekly).
- Frequency: 3 sessions per week, with a day in between to allow full recovery and adaptation.
- Rest between sets: 1.5–2 minutes (up to 3 minutes if needed) to prevent overexertion.
- Movement control: perform exercises slowly and correctly; the quality of movement is more important than the number of repetitions or the weight used.
- Recovery: stretching exercises for all major joints (both passive and dynamic), combined with correct breathing at the end of each session to restore heart rate.

Positive Effects of the Exercises: increased general muscle tone and strength; improved endurance and physical performance; development of coordination and balance; stimulation of cardiovascular and respiratory systems; enhanced metabolism and recovery capacity; preparation of the body for more intense or advanced physical activities.

Suggestions and Recommendations

The requirements for adapting the female body to moderate-intensity physical effort primarily aim to prevent overtraining, fatigue, and unwanted injuries, and to maintain high productivity throughout the entire training period. The most expected positive effects in this regard can be achieved only through strength-oriented exercises specifically designed for this purpose. Additionally, a detailed understanding of strength characteristics, including training methods, guidelines or permissible limits, and especially contraindications, is necessary for safe and effective application.

To achieve optimal results for adapting the female body to moderate-intensity effort, strength exercises performed in a resistance mode are required. This refers to the muscle's ability to perform a large number of repetitions (generally using body weight or light to

moderate weights) and its capacity to recover in time for subsequent exercises. The recommended load is 20–30% of maximal capacity, performed in 3–5 sets of 8–10–15 repetitions. Rest periods depend on the individual's ability to return to a heart rate of 120–130 beats per minute.

Adaptation to effort involves a combination of biological, functional, and psychological changes through which the body responds and adjusts to physical demands. In particular, this concept emphasizes performing strength exercises, which positively influence performance improvement. At the same time, exercises that facilitate adaptation, enhance motor capacities, and increase endurance should be *performed systematically* and repetitively.

Several key characteristics of adaptation to effort should be considered: progressivity – adaptation occurs gradually through repeated and progressive efforts, with incremental increases in intensity, duration, or complexity of exercises, allowing the body to adjust and develop its capacity for effort; individualization – the body's response depends on age, fitness level, health status, and metabolic characteristics; therefore, adaptation must be tailored to each individual; functionality – adaptation involves functional improvements in body systems, including cardiovascular, respiratory, muscular, nervous, and endocrine systems, enhancing energy efficiency, fatigue resistance, and overall physical capacity; reversibility – adaptation requires systematic engagement; it is a dynamic process that depends on continuity and regular maintenance of physical activity; specificity – adaptation depends on the type of effort: strength exercises induce muscular and neuromuscular adaptations, while endurance exercises stimulate the cardiovascular system and energy metabolism; complexity – adaptation involves not only physical but also psychological changes, including increased fatigue tolerance, motivation, discipline, and concentration.

In essence, the methodology for adapting the female body to moderate-intensity physical effort describes the process by which the body becomes accustomed to physical demands, improves its functions, and develops greater capacity for effort, ensuring harmonious and healthy development. This highlights the importance of proper exercise programming, graded effort, and the continuity of physical activity to achieve efficient and lasting results.

References:

1. Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2022). Exercise Physiology: Human Bioenergetics and Its Applications. McGraw-Hill.

2. ELLSWORTH, A. (2012). Pilates Anatomy. Hinkler Books, , 160 p. ISBN-9781741852929

3. DELAVIER, F. și M. GUNDILL: (2015). Muscles-Anatomy. Copyright, ISBN: 978-1-4504-6603-5

4. Dudnic Eugeniu, Buftea Victor, Dudnic Natalia. (2024). Note de curs la medicina sportivă / Universitatea de Stat de Educație Fizică și Sport, Facultatea Kinetoterapie, Departamentul Medicină Sportivă, - Chișinău, (Print Caro), - 121 p. ISBN 978-5-85748-000-7

5. Joy, E., et al. (2016). The Female Athlete Triad. British Journal of Sports Medicine, 50(4), 225–230.

6. Kenney, W. L., Wilmore, J. H., & Costill, D. L. (2020). Physiology of Sport and Exercise. Human Kinetics.

7. NICK EVANS (2007). Bodybuilding-Anatomy,USA: Human Kinetics, 192 p. ISBN 978- 985-15-0110-2

8. SIMION, Gh. și I. AMZAR (2009). Știința cercetării mișcării umane. Pitești: Universitatea din Pitești, p.39-41.